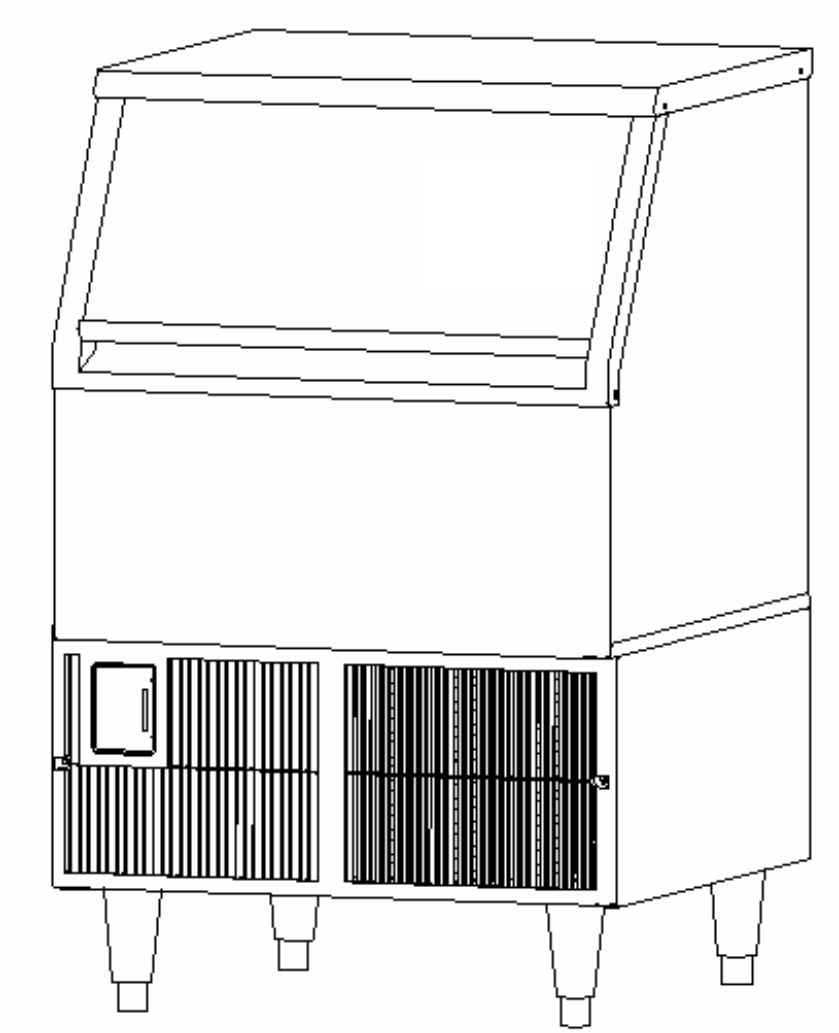
Automatic Ice maker

Service manual

MIM250



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Installation Guidelines

Note: Installation should be performed by a trained Service Technician.
For proper operation of the ice machine, the following installation guidelines must be followed. Failure to do so may result in loss of production capacity, premature part failures, and may void all warranties.

Ambient Operating Temperatures
Minimum Operating Temperature: 50°F (10°C)
Maximum Operating Temperature 100°F (38°C).
Note: These products are not designed for outdoor installation.

Incoming Water Supply
Minimum incoming water temperature: 40°F (5°C)
Maximum incoming water temperature: 90°F (32°C)
Minimum incoming water pressure: 15 psig
Maximum incoming water pressure: 80 psig
Note: If water pressure exceeds 80 psig, a water pressure regulator must be installed.

Drains: Route bin drain, purge drain and water condenser drain individually to a floor drain. The use of condensate pumps for draining water on equipment producing over 200 lbs./day is not recommended by Manufactor. We assumes no responsibility for improperly installed equipment.

Water Filtration
A water filter system should be installed with the ice machine.

Clearance Requirements
Self contained air cooled ice machines must have a minimum of 6 inches (15cm) of clearance at the rear, top, and sides of the ice machine for proper air circulation. Since undercounter machines breathe from the front, top and side clearances are minimal.

Stacking
If the ice machines are to be stacked, refer to the instructions in the stacking kit. We does not endorse stacking aircooled ice machines.

Dispenser Application
A thermostatic bin control kit must be installed if the ice machine is placed on a dispenser. A bin top may or may not be required.

Ice Maker Maintenance

Maintenance Procedure
1. Clean the icemaking section per the instructions below. Cleaning should be performed a minimum of every 6 months. Local water conditions may require that cleaning be performed more often.
2. Check ice bridge thickness. Proper thickness should be 1/16-1/8’’.
3. Check water level in trough. See troubleshooting for proper water level and adjustment.
4. Clean the condenser to insure unobstructed air flow.
5. Check for leaks of any kind: Water, Refrigerant, Oil, Etc.
6. Check the bin switch for proper adjustment.
7. Check all electrical connections.

8. Oil the fan motor if the motor has an oil fitting.

Cleaning and Sanitizing

Harvest problems may occur if the following procedures are not performed every 6 months.

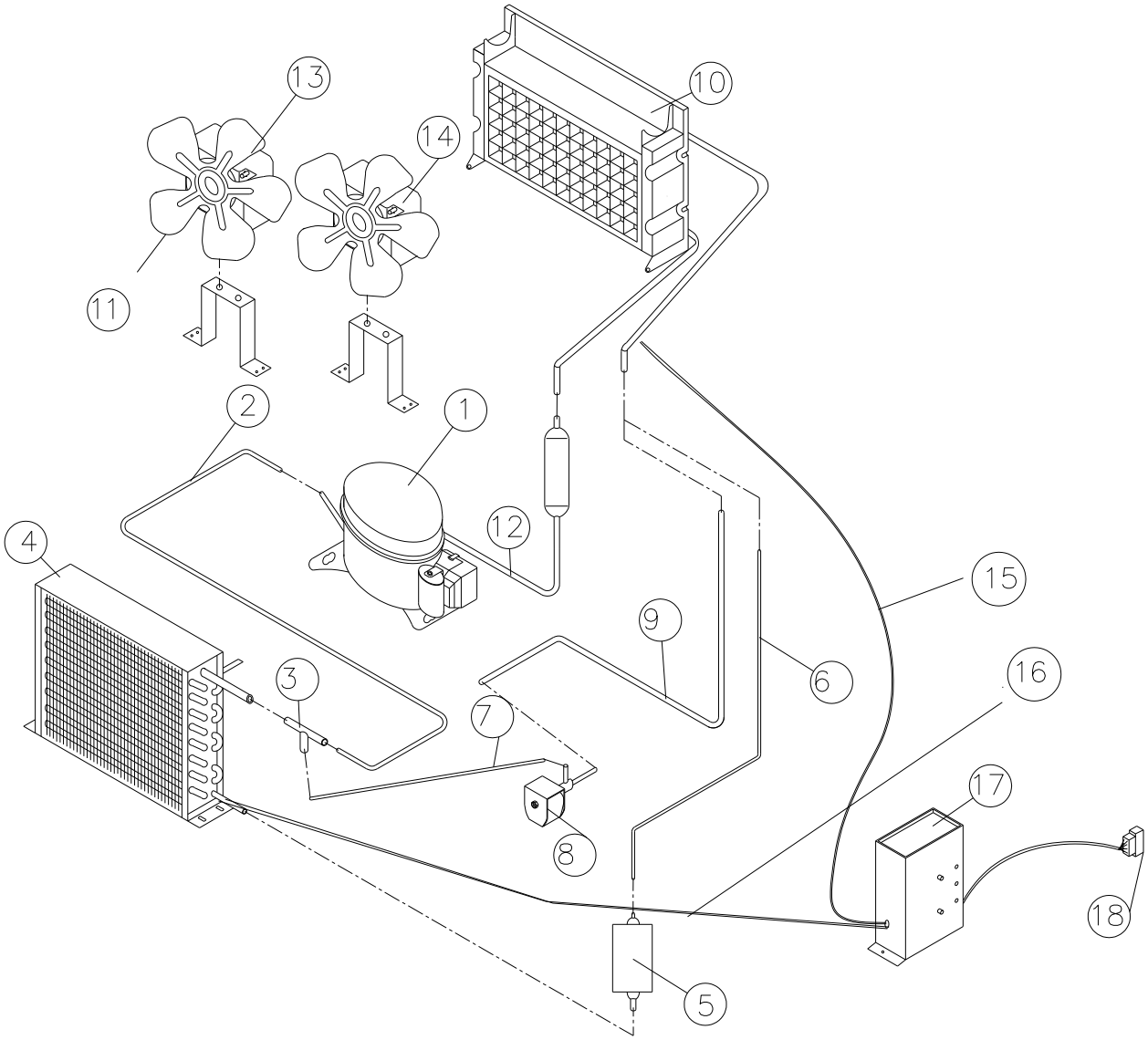
1. Remove the ice machine front panel.
2. Make sure that all the ice is off of the evaporator. If ice is being made, wait for cycle completion, then turn the machine "OFF" at the selector switch.
3. Remove or melt all ice in the storage bin.
4. Add recommended amount of approved ice machine cleaner to the water trough according to label instructions on the container.
5. Initiate the clean cycle at the controller board switch by turning on the machine and activating the switch marked as **"CLEAN"**. Note: This must be done within 3 minutes of turning the machine "ON". Allow the cleaner to circulate for approximately 15 minutes to remove mineral deposits.
6. After 15 minutes (or 30 minutes automatically), stop the process and drain the sump. Refill with clean water run another 5 minutes and drain again. Fill the trough with fresh incoming water.
7. Terminate the wash cycle at the switch by placing the switch in the **"OFF"** position. Remove the splash curtain (if available) and inspect the evaporator and water spillway (the plastic top of the evaporator) to assure all mineral residue has been removed.
8. If necessary, wipe the evaporator, spillway and other water transport surfaces with a clean soft cloth to remove any remaining residue. If necessary, remove the water distribution tube, disassemble and clean with a bottlebrush**.** Reassemble all components and repeat steps 4 through 7 as required to remove residue.
9. Turn **OFF** ice machine water supply and clean the water trough thoroughly to remove all scale or slime buildup. If necessary, remove the water trough to reach all splash areas and float.
10. Prepare 1½ to 2 gallons (5.7 to 7.5 liters) of approved (EPA/FDA) sodium hypochloride food equipment sanitizer to form a solution with 100 to 200 ppm free chlorine yield.
11. Add enough sanitizing solution to fill the water trough to overflowing and activate the switch to the **"CLEAN"** position and allow circulation to occur for 10 minutes and inspect all disassembled fittings for leaks. During this time, wipe down all other ice machine splash areas, plus the interior surfaces of the bin, deflector and door with the remaining sanitizing solution. Inspect to insure that all functional parts, fasteners, thermostat bulbs (if used), etc. are in place.
12. After 3 minutes, stop the process and drain the sump. Refill with clean water run another 5 minutes and drain again. Fill the trough with fresh incoming water.
13. Place the switch to the **"ON"** position and replace or close the panel. Discard the first two ice harvests.

How the Ice Maker Works

Refer to the **Operation** section of the User's Manual (pages 12 to 14) for a clear description of how the ice maker makes ice and uses water.

There are 3 systems: the Cooling System, the Water System and the Electrical System.

Cooling System

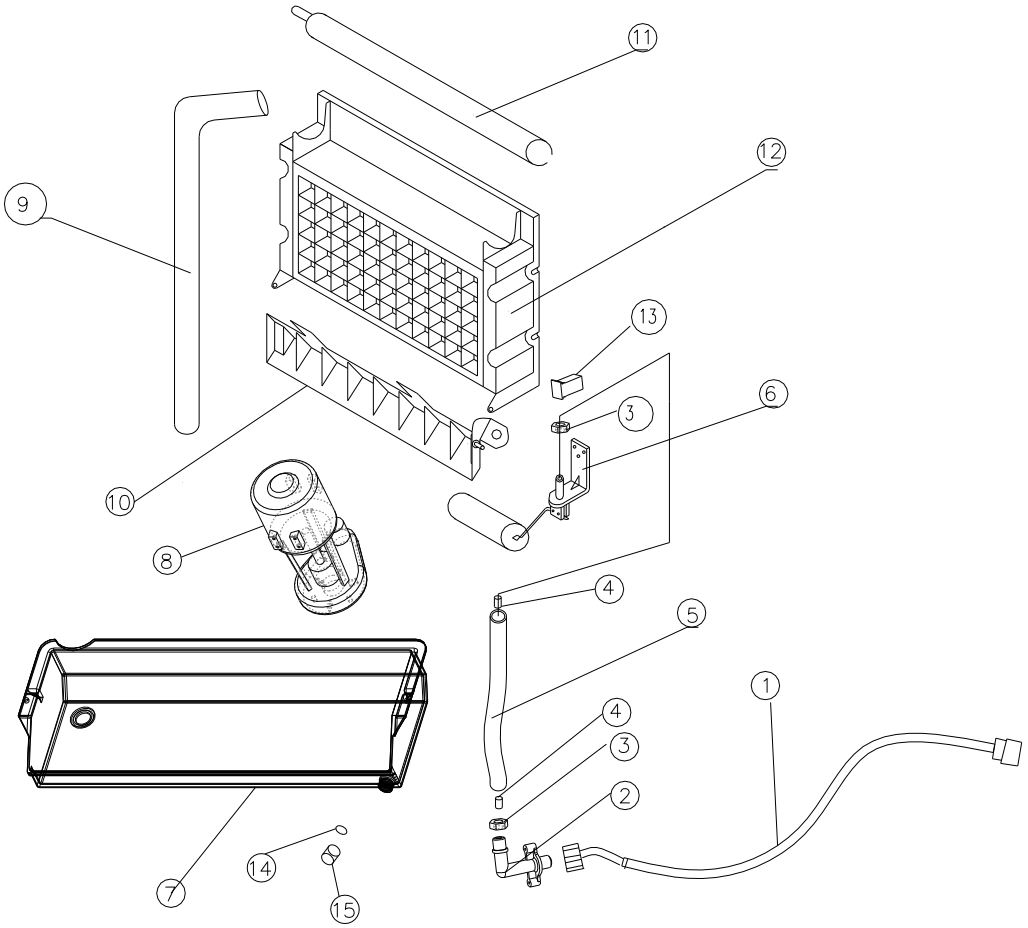


ITEM NO	DESCRIPTION
1	Compressor
2	Discharge tube
3	Cu three ways
4	Condenser
5	Drier and filter
6	Capillary tube
7	Connection tube
8	Hot gas valve
9	Hot gas tube
10	Evaporator (Ice Mold)
11	Fan blade(ϕ200X28°)
12	Suction pipe
13	Motor 5W
14	Motor 10W
15	Temperature sensor of the evaporator
16	Temperature sensor of the condenser
17	Controller

During the icemaking stage, the hot gas solenoid valve is **closed.** The hot refrigerant gas is pumped out of the compressor to the condenser. The hot gas is cooled by fanforced air to cool the liquid refrigerant after passing through the condenser. The drier and filter reduce possible dirt and moisture in the refrigerant. The refrigerant expands in the evaporator cooling it so ice will form while in the presence of water. Low pressure refrigerant gas returns to the compressor from the evaporator where the cycle continues.

During the ice harvest stage, the solenoid valve is **open**. The hot refrigerant gas is pumped out of the compressor to the evaporator through the hot gas valve. As the hot gas is not cooled by the condenser, the refrigerant warms the evaporator. Ice in contact with the evaporator begins to melt on the back side. The ice gradually ice slides off of the evaporator and drops to the storage bin.

Water System

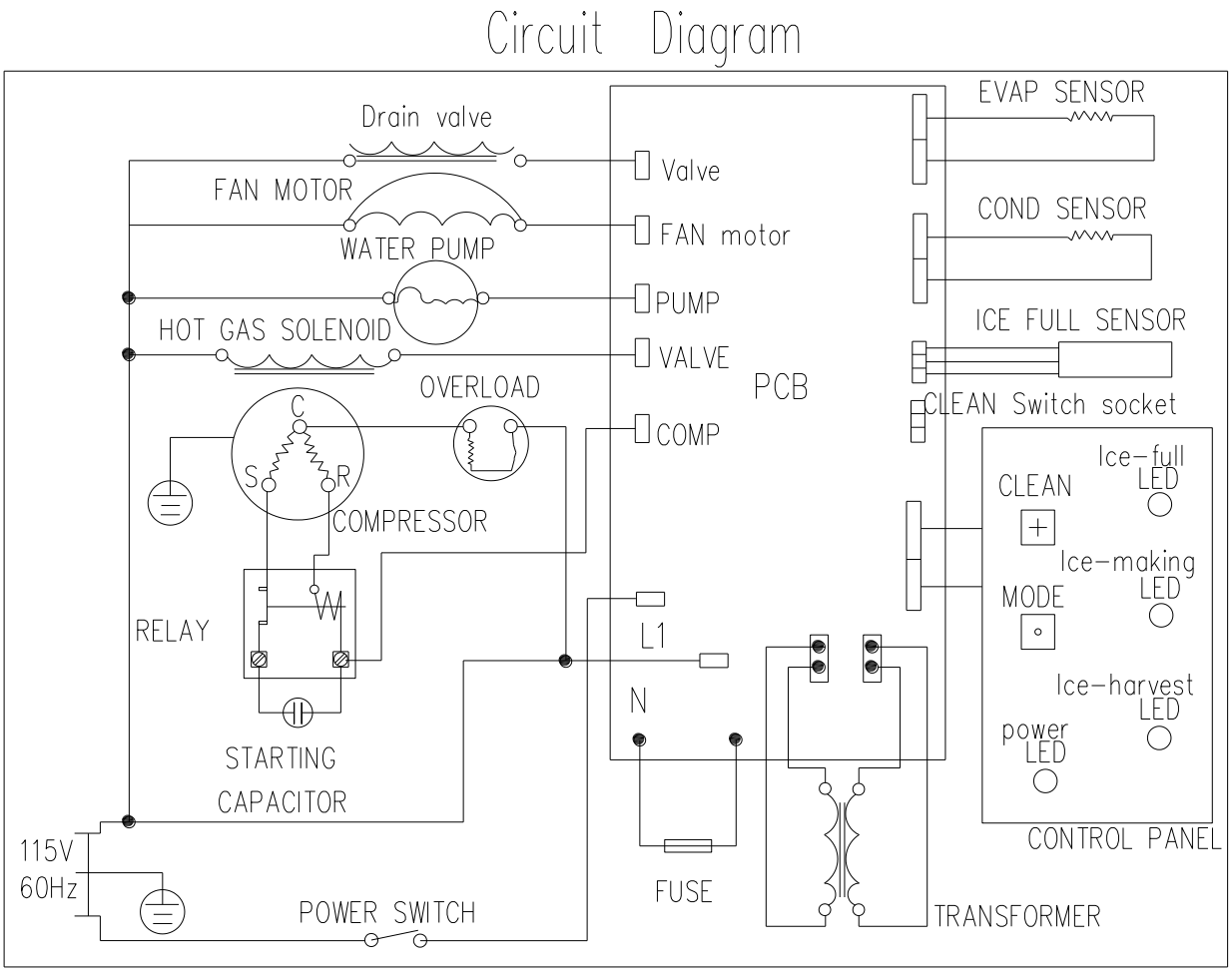


ITEM NO.	DESCRIPTION
1	Water supply tube
2	Water inlet connector
3	Nut of water inlet tube
4	Supporting tube
5	Water pump inlet tube
6	Floater valve
7	Water trough
8	Water pump
9	Water pump outlet tube
10	Ice slideway
11	Water distribution tube
12	Evaporator (Ice Mold)
13	Magnetism switch
14	Gasket
15	Screw cap

When the water inlet is connected with the main water supply, water will fill the trough through the float valve until the water level in the trough closes the valve. During the icemaking stage, water is pumped from the water trough to the water distribution tube. The distributed water flows over the

surface of the cold evaporator where the purest water is converted to ice. The unfrozen water returning to the trough. At the end of freeze cycle and during harvest, the water dump valve is opened and the mineral laden remaining water is pumped down the drain.

Wiring Connection :



Circuit Description

1. Electrify Status For The First Time

As the icemaker is properly installed. switch on the water tap, let the water trough full (reach on the level), then turn the Power switch to the ON position on the back panel. The icemaker will start working automatically

In this status, the time is fixed about 3 minutes. This function is also helpful to protect the compressor avoiding restart within 3 minutes.

At this status, the **White, Green, Yellow and Red** LEDs are light together.

2. Ice-making Status

The compressor, motor fan and pump are powered on. The hot gas solenoid valve is powered off.

When this green LED is lit, the unit is working in the ice making mode controlled by a temperature probe on the evaporator. When the green LED is flashing, the unit is working in the ice making mode controlled by a fixed timer.

The fan motor is also controlled by a condenser sensor. When the ambient temperature is too lower, the motor fan stop working for good condensation to refrigerant.

3. Ice Harvest Status

The pump is powered off. The hot gas solenoid valve, compressor and motor fan is powered on.

The fan motor is also controlled by a condenser sensor. When the ambient temperature is too lower, the motor fan stop working for good condensation to refrigerant.

The Yellow LED indicates the ice harvest status.

4. Ice Full Status And Cold Preservation Stage

If the ice bin is fulfilled with ice, the machine stops making ice and turn to cold preservation stage automatically.

In this status, the compressor works regularly to keep the lower temperature for lower ice melting. The rest of the electric components are powered off. The WHITE LED indicates the ice full status and the GREEN AND YELLOW LEDs together indicates the cold preservation status .

5. Cleaning Status

Turn the machine CLEAN SWITCH at the CLEAN in 3 minutes after the POWER SWITCH is turned on, the machine turn to Cleaning Status. At this status, the pump is powered on. Compressor, motor fan and are powered off. The GREEN and YOLLOW LEDs are flashing together. To stop the cleaning mode, turn the machine “OFF” at the Power switch or it will turned off automatically after 30 minutes.

NOTE: In order to start the Clean Status the power switch must be on. The CLEAN switch must be turned in 3 before the COMPRESSOR starts. To clean, it is no use turning the CLEAN switch when machine is in ice-making status or ice-harvest status.

Controller box:

Instructions for LEDs and buttons:

1. White LED: Ice full indicator light.

When this LED is lit, the ice storage bin is full of ice or there is something between the ice-full sensor and the evaporator. The unit will stop making ice. When ice cubes are taken out of the ice storage bin making the ice-full probe free, the white LED will keep flashing for 3 minutes. Then the unit will restart and return to the ice making mode.

2. Green LED: Ice making indicator light.

When this LED is lit, the unit is working in the ice making mode controlled by a temperature probe on the evaporator. When the green LED is flashing, the unit is working in the ice making mode controlled by a fixed timer.

3. Yellow LED: Ice harvest indicator light.

When this LED is lit, the unit is working in the ice harvest mode controlled by ice-full probe.

When green LED and yellow LED is lit, it means the unit is working in the cold preservation stage .

4.Red LED: power indicator light.

The power is on when the red LED is lit.

5. Mode button:

Mainly for service. When this button is pressed, it can change from ice making mode to ice harvest mode, or from ice harvest mode to ice making mode. You can judge the mode from the status of the green and yellow LEDs.

6. Ice size adjust:

1. Press and hold the "**Clean**" button and the "**Mode**" button together for at least 3 seconds. The unit will enter the Ice Size Adjustment mode. The "**ICE**" LED (green) will be blinking continuously during the ice size adjustment.
2. While in the Ice Size Adjustment mode, press the "**Clean**" button or the "**Mode**" button for the desired ice size.

Smaller ice setting:

By pressing the "Clean" button, you can decrease the size of the ice cubes. The "FULL" LED (red) will flash as you lower the ice size and will finally be blinking at the setting of smallest ice size.

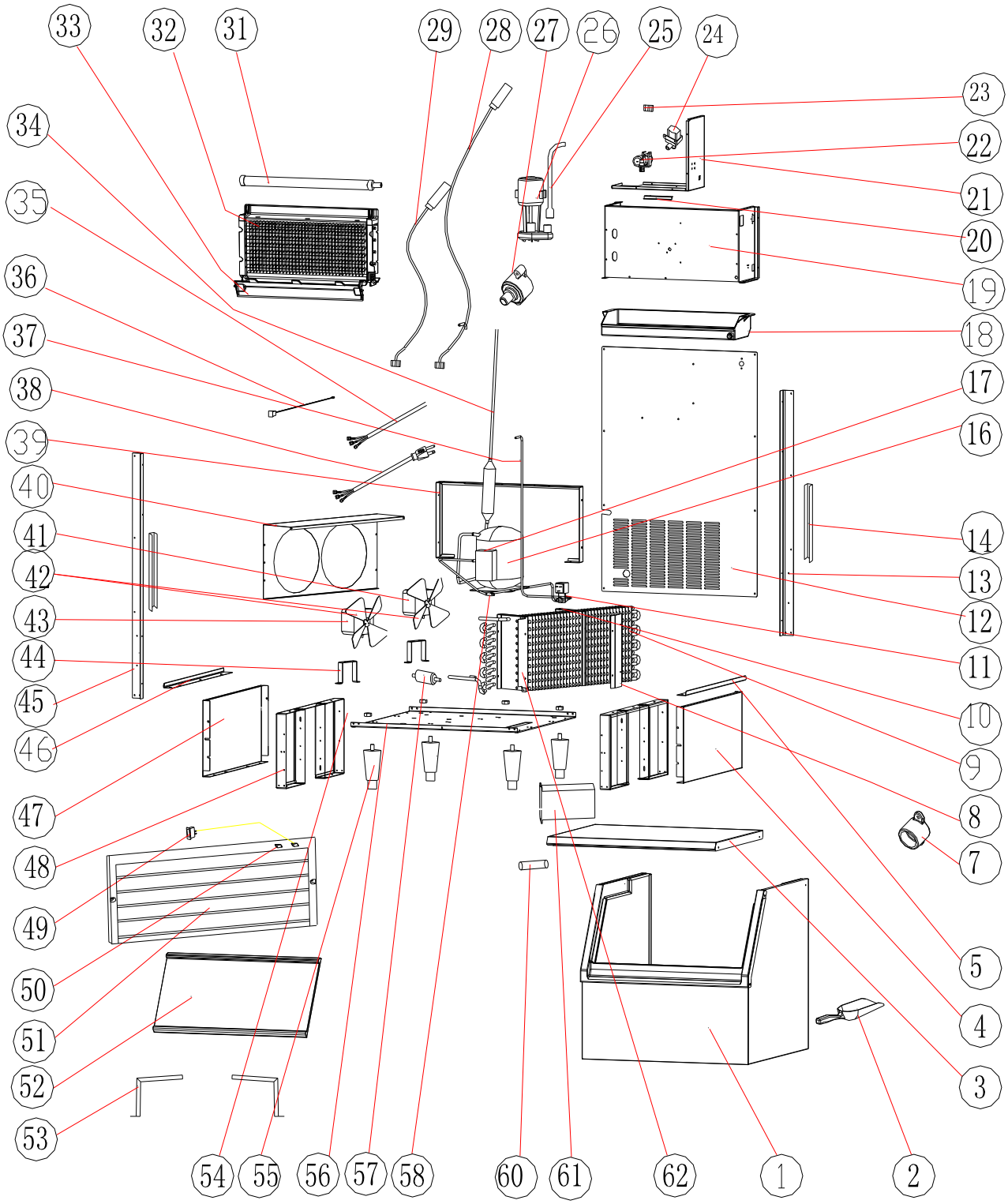
Larger ice setting:

By pressing the "Mode" button, you can increase the size of the ice cubes. The "HARVEST" LED (yellow) will flash as the larger size is set and will blink when the setting of largest ice size has been reached.

After 10 seconds without any operation, the unit will automatically memorize the current state and return to the previous mode.

NOTE: If during the ice size adjustment, the "BIN FULL", "ICE" and "HARVEST" LEDS blink all at once, this indicates that the unit is in the default factory setting of the ice size adjustment.

Exploding Drawing



Item No.	Description
2	Ice scoop
3	Top panel
7	Drain nut
9	Condenser
10	Hot gas valve body (EVU3)
11	Hot gas valve coil（042N4212）
16	Compressor
17	Compressor starting device component
18	Water trough
22	Floater valve
23	water inlet pipe screw
24	Drain valve
25	Water out tube of pump
26	Water pump
27	Water inlet
28	Condenser sensor
29	Evaporator sensor
31	Water sprinkler
32	Evaporator (Ice Mold)
33	Ice slideway
35	Wiring harness
36	Magnetism switch
38	Power plug
41	EBM motor 5W
42	Fan blade (φ200X28°)
43	EBM motor 10W
49	Power switch
50	Clean switch
51	Under louver
52	Door
54	Locked screw(Block screw)
55	Foot
57	Drier
60	15A fuse of controller
61	Control box

Troubleshooting

Before Maintenance
1. Be sure the electrical supply is 115 VAC, 60Hz, 15A and is properly grounded to protect maintenance personnel against electrical shock.
2. Are any electrical leads loose? Danger of short circuit? If so, disconnect power.

Basic Troubleshooting

Some problems can be pinpointed through the service technician's senses of hearing, sight and touch. Examples are listed below.

Listen

- Listen to the user's description of how the ice maker was operating, especially the depiction of unusual phenomena. Ask how the unit was operating before the user called for service and try to deduce the defect from the comments.
- Does the machine sound normal when it is running (like a window air conditioner)?

Look

- Check the cooling system tubing, especially the welded joints. If some oil can be seen, the gas may be leaking resulting in less than the normal amount of ice is being produced.
- Is the cycle of the icemaking and ice harvesting normal (Does water run, is the fan running and is the evaporator getting cold enough)?
- Check the water system especially at the connections. Are there any water leaks?
- Check the flow of water through the water filter and if not, replace the water filter.
- Check if the ice maker was installed according to the user's manual (level and air space).
- Inspect the ice maker to see if it needs to be cleaned. Please note, cleaning a dirty ice maker is not a warranty repair!

Feel

- Touch the tubing at the evaporation weld, feeling the temperature. During the icemaking stage, it should feel cold. During the ice harvest stage, it should feel hot.
- If appropriate, touch the capillary tube or TXV tubing (near the drier). It should feel warm during the ice making stage.

Troubleshooting Guide

This troubleshooting guide in the user manual should be read before this guide. Be sure only when the trouble shooting in user manual can't help you solve the problem, turn to this guide.

Troubleshooting Guide

A. Machine Does Not Run

Step	Check	Yes	No
A1	Switch On?	Turn On	A2
A2	Power to Machine?	Rewire	A3
A3	Bin Full?	A4	Take ice out
A4	Bin control adjusted?	Adjust	A5
A5	High Pressure Safety tripped?	A6	Reset clean condenser
A6	Is selector switch out?		Replace

B. Machine Runs, Does Not Ice

Step	Check	Yes	No
B1	Water running over evaporator?	No B2	Go to C.
B2	Is compressor running?	B5	B3
B3	Power to compressor?		Check for bad contactor or bad start components
B4	Is switch defective?	Replace	
B5	Water leaking from trough?	Repair leak	B6
B6	Is refrigerant pressure High?	Clean condenser Check HGV	B7
B7	Is refrigerant pressure Low?	Check for Leak	B8

		Weigh in new	
B8	Low side restriction?	Repair	TXV defective

C. Machine Produces Cloudy Ice or Incomplete Cubes

Step	Check	Yes	No
C1	Water running over evaporator?	C2	C3
C2	Machine Level?	Incoming water quality poor	Level
C3	Trough water level correct?	C6	C4
C4	Supply pressure correct?	C5	Correct deficiency
C5	Water Leak?	Repair Leak	Adjust float valve
C6	Water Distribution tube plugged?	Clean/Replace	C7
C7	Water Pump OK?	Clean evaporator spillway	Replace/Repair pump

D. Cube Size Good, But Slow Production

Step	Check	Yes	No
D1	Installed Correctly?	D2	Correct installation
D2	Head pressure too high?	D3	Check Refrigeration system
D3	Condenser Clean?	Check Refrigeration system	Clean

E. Cubes are Hollow

Step	Check	Yes	No
E1	Is water temp above 100 deg.F?	Correct temperature	E2
E2	Good flow over evaporator?	E3	Go to C
E3	Water leaking from purge?	Replace Valve	E4
E4	Does cube adjust work?	Reset cube size	E5
E5	Is the evaporator sensor loose?	Tighten	E6
E6	Is the evaporator sensor wire tight?	E7	Tighten spade connection to board
E7	Is the controller OK?		Replace

F. Bridge Thickness is Uneven

Step	Check	Yes	No
F1	Is water temp above 100 deg.F?	Correct temperature	F2
F2	Water running into bin?	Ck C,D,E or examine trough for leak.	F3
F3	Water leaking from purge?	Replace Valve	F4
F4	Suction pressure High?	Examine Hot Gas Valve	Recharge and/or examine TXV

G. Bridge Thickness Varies with Each Cycle

Step	Check	Yes	No

G1	Is water temp proper?	Correct installation	G2
G2	Is purge valve leaking?	Replace valve	G3
G3	Is Hot Gas Valve OK?	G4	Replace
G4	Are sensors connected to Board?	G5	Tighten spade connections
G5	Is the Controller OK?	G6	Replace
G6	Thermal Expansion Valve	Replace	

H. Machine Does Not Enter Harvest

Step	Check	Yes	No
H1	Does the purge valve energize?	H6	H2
H2	Is freeze pattern even?	H3	H2
H3	Is purge valve leaking?	Replace	H3
H4	Is compressor failing?	Replace	H4
H5	System overcharged?	Cut Charge	Replace TXV
H6	Is the relay defective?	Replace	H7
H7	Is the board defective?	Replace	

I. Machine Harvests but returns to Ice-Making prematurely

Step	Check	Yes	No
I1	Is the manual purge Open?	Replace Purge valve	I2
I2	High Temp Safety switch Open?	Replace	I3
I3	Relay OK?		Replace

J. Length of Harvest Excessive

Step	Check	Yes	No
J1	Machine installed correctly?	J2	Correct
J2	Is ice formed correctly?	J3	Low charge - recharge
J3	Suction pressure too low?	Replace Hot Gas Valve	J4
J4	Is evaporator clean?	J5	Clean according to directions
J5	Is the ice bridge correct?	J6	Go to F,G – set
J6	Machine Level?	J7	Correct
J7	Does water run over evaporator during harvest?	Clean, J11	J8
J8	Is Purge valve leaking?	Replace	J9
J9	Is relay OK?	J10	Replace
J10	Is selector switch OK?		Replace
J11	Suction Pressure OK?	Replace evaporator	J12
J12	Discharge pressure low during freeze?	Ambient temp too low	Replace Hot Gas Valve

K. Evaporator Gets Hot

Step	Check	Yes	No
K1	Installed correctly?	K2	Correct installation

G1	Is water temp proper?	Correct installation	G2
G2	Is purge valve leaking?	Replace valve	G3
G3	Is Hot Gas Valve OK?	G4	Replace
G4	Are sensors connected to Board?	G5	Tighten spade connections
G5	Is the Controller OK?	G6	Replace
G6	Thermal Expansion Valve	Replace	

H. Machine Does Not Enter Harvest

Step	Check	Yes	No
H1	Does the purge valve energize?	H6	H2
H2	Is freeze pattern even?	H3	H2
H3	Is purge valve leaking?	Replace	H3
H4	Is compressor failing?	Replace	H4
H5	System overcharged?	Cut Charge	Replace TXV
H6	Is the relay defective?	Replace	H7
H7	Is the board defective?	Replace	

I. Machine Harvests but returns to Ice-Making prematurely

Step	Check	Yes	No
I1	Is the manual purge Open?	Replace Purge valve	I2
I2	High Temp Safety switch Open?	Replace	I3
I3	Relay OK?		Replace

J. Length of Harvest Excessive

Step	Check	Yes	No
J1	Machine installed correctly?	J2	Correct
J2	Is ice formed correctly?	J3	Low charge - recharge
J3	Suction pressure too low?	Replace Hot Gas Valve	J4
J4	Is evaporator clean?	J5	Clean according to directions
J5	Is the ice bridge correct?	J6	Go to F,G – set
J6	Machine Level?	J7	Correct
J7	Does water run over evaporator during harvest?	Clean, J11	J8
J8	Is Purge valve leaking?	Replace	J9
J9	Is relay OK?	J10	Replace
J10	Is selector switch OK?		Replace
J11	Suction Pressure OK?	Replace evaporator	J12
J12	Discharge pressure low during freeze?	Ambient temp too low	Replace Hot Gas Valve

K. Evaporator Gets Hot

Step	Check	Yes	No
K1	Installed correctly?	K2	Correct installation

K2	Is the condenser fan turning?	K3	Tighten blade, check wires, replace motor.
K3	Are Hot Gas Valve connections loose?	Tighten all wiring connections	K4
K4	Is machine charged correctly?	K5	Charge correctly
K5	Is controller operating correctly?	Replace Hot Gas Valve	Replace controller board

L. The Compressor Does Not Start or Starts Frequently

Step	Check	Yes	No
L1	Is condenser dirty?	Clean	L2
L2	Has the fan stopped or is dirty?	Repair/Clean	L3
L3	Are the wires tight on the controller?	L4	Tighten all spade connections
L4	Are the compressor start components OK?	L5	Replace components
L5	Is the controller board OK?	L6	Replace
L6	Is the compressor OK?		Replace

M. Compressor Runs but no ice produced

Step	Check	Yes	No
M1	Is the air vent obstructed?	Clear path	M2
M2	Is the condenser dirty?	Clean	M3
M3	Is the fan turning?	M4	Replace fan motor
M4	Is there a refrigerant leak?	Add valve, recover refrigerant, fix and charge (replace filter)	M5
M5	Is the TXV or cap tube operating normally?	M6	Add valve, recover refrigerant, fix and charge (replace filter)
M6	Does the ice making mode convert to harvest?		Replace controller board

N. Machine Makes Excessive Noise

Step	Check	Yes	No
N1	Are the panels loose?	Tighten all screws	N2
N2	Is the fan hitting the shroud?	Realign	N3
N3	Is the fan blade loose?	Tighten	N4
N4	Is the pump noisy?	N5	N6
N5	Is there an object in the impeller?	Remove object	Replace Pump
N6	Is the copper tubing inside the machine rubbing?	Bend away from each other	N6

N6	Is the noise from the compressor?	Replace compressor	

Adjustment and Replacement

Replace Control box, fuse and the sensor of temperature

Replacing Control Box Fuse and Temperature Sensor

- Remove the rear cover and the louvered front panel or the side panel on a modular unit.
- Locate the electronic control box in the unit.
- Carefully pull out the temperature sensors (one at the evaporator, another at the condenser).
- Loosen the screws holding the control box, replace with a new one. Reverse the foregoing steps to reassemble.
- If you need to replace the fuse, open the front panel of the control box and you will find this figure:
- If you need to replace a temperature sensor, pull out the sensor, open the panel of the control box, pull out the other end of the sensor, replace with a new one. Reverse these steps to reassemble.

Replacing the water pump

- Disconnect electrical power.
- Remove the front cover.
- Unplug the lines connected with the water pump, including the water outlet tube of the pump.
- Loosen the screws. Replace the pump with a new one.
- Reverse the above steps to reassemble.

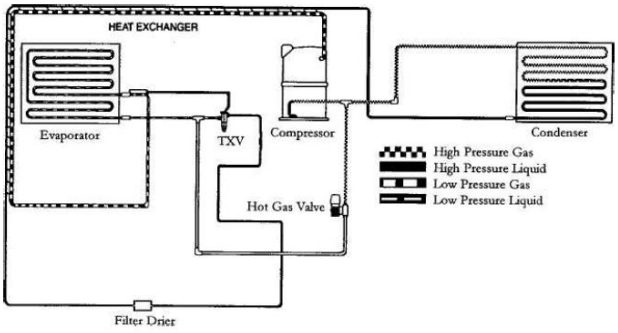
Replacing the cooling system components

To replace the condensing components, see the *Cooling System* figure.

1. Replacing the compressor and the compressor kit *(includes relay, thermal protect)*

- If only the compressor kit needs to be replaced, remove the top panel and left panel, locate the compressor, take off the clip, replace the defective components.
- Reverse the above steps to reassemble.

ELECTRICAL SHOCK HAZARD
Disconnect electrical power before beginning removal of parts.



- If the compressor needs to be replaced, remove the top cover and locate the compressor.
- Unplug lines and remove ground line, open the Process/Suction, evacuate refrigerant, take out compressor, replace with a new one, join together, then recover refrigerant, weigh in the charge on the nameplate.
- Reverse the above steps to reassemble.

2. Replacing the fan motor and fan blade

- Remove the top and right panels.
- Locate the fan motor, unplug the lines connected with the fan motor, loosen the screws of the holding bracket and fan motor bracket, remove the damaged unit and replace with a new one.
- Reverse the above steps to reassemble.

3. Replacing the hot gas valve, drier and evaporator

- Remove the top panel.
- Locate the drier and hot gas valve, open weld, replace the drier and hot gas valve, weld, recover refrigerant, evacuate and weigh in the charge on the nameplate.
- Reverse the above steps to reassemble.
- If needed, replace the evaporator.
- Remove the front and top panels, locate the evaporator, open the Process/Suction, open the two welds, replace with a new evaporator. Recover refrigerant, evacuate and weigh in the charge on the nameplate.
- Reverse the above steps to reassemble.

ADVANCED COMPONENT TROUBLESHOOTING TECHNIQUES

Refrigeration System

Refrigerant Cycle and Components

Before diagnosing the refrigeration system, it is very important that the refrigeration charge be correct. Whenever the refrigeration system has been opened, the filterdrier must be replaced and the proper refrigerant charge must be weighed in.

Refrigerant Pressures

The suction pressure at the beginning of the freeze cycle can vary +/10 psi (.7 bar) depending on operating conditions. Pressures less than this may indicate an undercharge. The discharge pressure on air cooled units will vary with ambient conditions.

Refrigerant in a gas state is pumped throughout the refrigeration system by a hermetic **compressor** to the **condenser.** Heat is removed from the refrigerant either by forced air movement through an aircooled condenser or transferring heat from the refrigerant to water through a watercooled condenser. The refrigerant changes to a liquid when cooled. The refrigerant in a liquid state passes through a **filter drier.**

The filter drier traps small amounts of moisture and foreign particles from the system. The filter drier **must be** replace whenever the refrigeration system is opened or if the refrigerant has been completely lost.

Compressor

The compressor runs during the entire cycle. If the valves in the compressor are damaged, the compressor will be unable to pump refrigerant efficiently. Damaged valves may be the result of another problem in the refrigeration system such as liquid refrigerant returning to the compressor or high head pressure. When a compressor is replaced it is important that the refrigeration charge be weighed in and the system checked for proper operation to prevent a repeat failure.

An inefficient compressor will usually have a higher than normal suction pressure at the end of the cycle. The freeze cycle will be longer than normal and/or the harvest cycle may be excessively long. Check the compressor amperage draw 5 minutes into the freeze cycle. If the amp draw is less than 70% of rated full load amps, the compressor may be inefficient. These symptoms may also be caused by other problems, therefore it is important to use the troubleshooting charts when diagnosing a problem.

The air condenser is located in the back of the cabinet. Air is pulled through the condenser by a fan motor and discharged through the right hand side panel. The Undercounter air intake and discharge is through the front panel.

Do not block airflow as it will cause premature failure of the machine and will void the warranty.

Compressor Check

Compressor and Start Components

The compressor should run during the entire cycle. If the machine is in the ON position but the compressor is not running, check the compressor contactor to see if it is engaged. If the contactor is not engaged, the problem is not with the compressor or the compressor start components. If the contactor is engaged and there is correct voltage through the contactor, there could be a problem with one of the starting components or the compressor. It is recommended that the compressor starting components be replaced when replacing a compressor.

DISCONNECT POWER BEFORE SERVICING!

If the compressor uses an internal overload, be certain that the compressor has cooled and the overload has reset before diagnosing the compressor. If the compressor is cool and is still not running, check the compressor motor windings by first removing the wires at the compressor terminals. With an ohmmeter, check for continuity between all three terminals, if an open circuit exists between any of the terminals, the compressor may need to be replaced. Check for continuity from each terminal to the compressor body, if continuity is found from any terminal to the compressor body, the compressor windings are shorted to ground and the compressor will need to be replaced. If the compressor appears to be good at this point, it is advisable to use a compressor analyzer to isolate the compressor from the start components while checking for a locked rotor. If an analyzer is not available, the compressor starting components must be checked.

If all starting components are good, check the amperage draw from the common terminal of the compressor, making sure proper voltage is supplied to the compressor and all wiring is properly connected. If the compressor does not start and there is excessive amperage draw, (see locked rotor amps on compressor tag) the compressor has a locked rotor and should be replaced.

Overload (External)

If there is no amperage draw check the compressor overload. The compressor overload can be checked for continuity after removing it from the compressor and letting it cool to room temperature. If there is no continuity between the two terminals, replace the overload. If the overload is suspected of opening prematurely, it should be replaced with an overload, which is known to be good.

Capacitors

The start capacitor is an electrical storage device used to provide starting torque to the compressor. If a start capacitor is defective, the compressor will not start properly. The run capacitor is an electrical storage device used to improve the running characteristics and efficiency of the compressor. Before checking a capacitor, it should be discharged by shorting across the terminals. If a run or start capacitor is cracked, leaking or bulging it should be replaced. If a capacitor is suspected of being defective, it can easily be checked by replacing it with a capacitor of the correct size, which is known to be good. If the compressor starts and runs properly, replace the original capacitor. A capacitor tester can also be used.

Start Relay

The start relay breaks the electrical circuit to the start windings when the compressor motor speed increases. If the relay is defective, the compressor will not start or it may start but will run for a very short time.

A compressor relay can be checked by removing the relay and checking the relay contacts for damage and check for continuity across the closed relay points. Check the relay coil with an ohmmeter. If no continuity is read, replace the relay.

Other Components

Thermostatic Expansion Valve (TXV)

The thermostatic expansion valve meters the flow of refrigerant into the evaporator changing its state from a highpressure liquid to a lowpressure liquid. This drop in pressure causes the refrigerant to cool. The cooled refrigerant absorbs heat from the water circulating over the evaporator. As the evaporator fills with liquid refrigerant, the evaporator becomes colder.

The flow of refrigerant into the evaporator is controlled by the temperature at the outlet of the evaporator. The expansion valve bulb, mounted to the top of the suction line, senses the evaporator outlet temperature causing the expansion valve to open or close. As ice forms on the evaporator, the temperature drops and the flow of refrigerant into the evaporator decreases, resulting in a drop in suction pressure.

The evaporator should become completely flooded (filled with liquid refrigerant) during the freeze cycle. A completely flooded evaporator will have a uniform freeze pattern (ice formation across the evaporator).

A starved evaporator (not enough liquid refrigerant) will have poor or no ice formation at the top of the evaporator, and the tube(s) exiting the evaporator will not frost. All tubes should be frosted approximately 5 minutes from the start of the freeze cycle.

An expansion valve that is restricted or not opening properly will starve the evaporator resulting in lower than normal suction pressure. A low refrigerant charge will also starve the evaporator and cause low suction and discharge pressures. If not sure of the amount of charge in the system, the refrigerant should be recovered and the correct charge be weighed in before a defective valve can be diagnosed.

If the evaporator is starved but the suction pressure is higher than normal, the TXV is not the problem, refer to the troubleshooting section. **If the TXV sticks open** or if the thermal bulb is not making good contact with the suction line, the flow of refrigerant into the evaporator will be too great and liquid refrigerant will flood the compressor. The suction pressure will remain higher than normal and the machine will remain in an extended freeze cycle. **Ice will build evenly but will be very thick**.

Symptom	Problem	Possible Correction
Evaporator cold but suction pressure not dropping. Compressor has been checked and appears to be good. Suction line at compressor may be colder than normal.	1 TXV thermal bulb not making good contact with suction line or uninsulated	1 Tighten bulb clamp and/or insulate bulb.
	2 TXV bulb installed incorrect	2 Locate bulb on top of suction line
	3 System overcharged	3 Recharge system
	4 TXV stuck open	4 Replace TXV
Evaporator starved, no frost on line(s) exiting evaporator. Suction pressure is low.	1 Machine low on charge	1 Recover refrigerant and weigh in proper charge
	2TXV restricted or stuck closed	2 Replace TXV and drier

Hot Gas Valve

When the machine enters harvest the hot gas valve coil is energized opening the hot gas valve. Discharge gas is pumped through the hot gas valve directly into the evaporator. The evaporator temperature will reach approximately 40°F (4.5°C). The suction pressure during harvest should be a minimum of 70 psi (4.8 bar) for R404a units or 50psi (3.4 bar) for R134a units. The discharge pressure will drop during harvest.

If the hot gas valve does not completely open during harvest, there will not be enough hot gas in the evaporator to defrost the ice. If there is not enough hot gas entering the evaporator, the suction pressure will be lower than the above stated pressures. It is important when making this check that the machine has the proper refrigerant charge, normal head pressure and the compressor is

functioning properly. If the hot gas valve leaks during the freeze cycle, ice will not form on the top of the evaporator and suction pressure will be higher than normal. To check if the hot gas valve is leaking, let the machine run in the freeze cycle for approximately 5 minutes. Now feel the temperature between the inlet and outlet of the valve. A definite temperature difference should be felt. If the lines are the same temperature and the suction pressure is higher than normal; the valve is leaking and should be replaced.

Symptom	Problem	Possible Correction
Evaporator remains cold during defrost and suction pressure is low. Suction line at compressor may be colder than normal.	1 Refrigerant charge too low	1 Recharge system.
	2 Hot Gas Valve does not open completely	2 Replace Hot Gas Valve
Evaporator has ice at the top, temperature at inlet and outlet of the valve is the same.	1 Compressor failing	1 Check and replace if necessary.
	2 Hot Gas Valve Leaking	2 Replace Hot Gas Valve

Evaporator

As water is circulated over the front of the evaporator, liquid refrigerant is circulated through the tubing attached to the back of the evaporator. As the liquid refrigerant in the tubing vaporizes, it absorbs heat from the water causing the water to freeze. The evaporator should be completely flooded throughout most of the freeze cycle. A flooded evaporator will build ice evenly across the evaporator. A starved evaporator will have thick ice at the bottom and thin ice at the top. Most problems with ice formation or harvesting are not related to a defective evaporator.

If the evaporator is flooded but not building ice evenly, it is possible the evaporator has coil separation. Evaporator coil separation is the separation of the refrigerant tubing from the back of the evaporator plate. This is very rare but occasionally occurs. The symptoms of coil separation are low suction pressure, ice not releasing from the evaporator during harvest and hollow cubes or uneven ice bridge on some areas of the evaporator.

If coil separation is suspected, let the machine run in freeze until the timer has energized. Check the evaporator for areas where cubes are less developed than cubes in other areas. If the cubes are all the same size, coil separation is not the problem. If there are areas other than the top row with less developed cubes, check the refrigerant lines at the inlet(s) and outlet(s) of the evaporator, if both lines are frosted the coil is separated. To confirm coil separation, remove and check the back of the evaporator. If the coil is separated, the evaporator must be replaced. If the outlet(s) of the evaporator is not frosted, the problem is not with coil separation (refer to Troubleshooting).

Note: Permanent discoloration of the evaporator plating is normal and will cause no problems with harvesting the ice or sanitary conditions. Before condemning the evaporator for plating problems, be certain it is not just discoloration. Good evaporators will not be covered under warranty. If the spillway (plastic evaporator top) becomes damaged, it can be replaced. It is not necessary to replace the entire evaporator.

As liquid refrigerant leaves the evaporator, it changes to a lowpressure gas before returning to the compressor. Liquid refrigerant must not return to the compressor or damage will result. Frost on the suction line at the inlet of the compressor indicates liquid returning to the compressor. Check for frost at the end of the freeze cycle. If liquid is returning to the compressor, the problem must be located and corrected. See Refrigerant Charge, Thermostatic Valve and Evaporator.

Refrigerant

Refrigerant in a highpressure liquid form is fed to an expansion valve where the refrigerant is reduced to a lowpressure liquid. Under this low pressure, the liquid will absorb heat from the evaporator causing the liquid to change to a vapor. This vapor is the drawn into the compressor

where the temperature and pressure of the vapor are increased. The high temperature, high pressure vapor flows to the condenser where the heat is removed, causing the vapor to return to the liquid form, making the refrigerant ready to flow back to the evaporator to pick up more heat. ice machine use R134a or R404a refrigerant. Always check the serial number data plate for the proper type of refrigerant and the amount used in the machine you are servicing.
R404a and R134a are both HFC refrigerants, which result in no ozone depletion factor. R404a cylinders are orange in color, R134a cylinders are light blue in color. Do not switch refrigerants in the machine.

Important: When discharging refrigerant from an icemaker, recover as much of the refrigerant as possible with a recovery device or some other means to prevent the refrigerant from entering the atmosphere.

Electronics and Sensors

Control Board Checks

Timer Initiate

The timer initiate is a temperature sensor mounted on the liquid line to the evaporator. When the sensor detects the correct low temperature the freeze timer is energized and the machine enters the timed portion of the freeze cycle. When the freeze timer is energized, the machine is in the timed portion of the freeze cycle. When the machine enters harvest, the temperature rises, but the amount of time the machine is in harvest is predetermined and is controlled by the Controller Board. Once the time has passed, the machine will enter the harvest cycle. The timer is not adjustable, but the temperature at which the timer is initiated is adjustable as is outlined below.

Adjustments

Ice size adjust

1. Press and hold the "**Clean**" button and the "**Mode**" button together for at least 3 seconds. The unit will enter the Ice Size Adjustment mode. The "**ICE**" LED (green) will be blinking continuously during the ice size adjustment.
2. While in the Ice Size Adjustment mode, press the "**Clean**" button or the "**Mode**" button for the desired ice size.

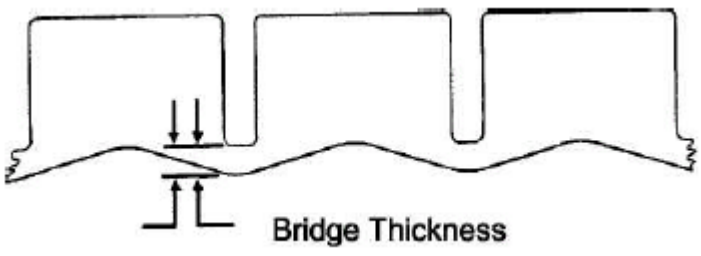
Smaller ice setting:

By pressing the "Clean" button, you can decrease the size of the ice cubes. The "FULL" LED (red) will flash as you lower the ice size and will finally be blinking at the setting of smallest ice size.

Larger ice setting:

By pressing the "Mode" button, you can increase the size of the ice cubes. The "HARVEST" LED (yellow) will flash as the larger size is set and will blink when the setting of largest ice size has been reached.

After 10 seconds without any operation, the unit will automatically memorize the current state and return to the previous mode.



Bin Control Operation
The bin control is used to shut the machine off when the bin fills with ice. The bin control must be checked upon installation or initial startup and when performing maintenance. **Adjustments are notcovered under warranty.**
There is one bin switch for each evaporator. The actuator arm of the bin switch comes in contact with the splash curtain. When the bin is full of ice, the splash curtain is held open when ice drops off of the evaporator. This releases the pressure of the bin switch actuator arm allowing the switch to open.
Undercounter and machines without curtains: An ice slide at the bottom of the evaporator is used on all undercounter and some modular units. The slideway swivels up and down and has a magnetic reed switch which detects its position. When ice is sitting on the control, the slideway faces down indicating that ice is present (and disconnecting the circuit from the reed switch). When the ice is removed, the slideway swivels up and the connection is completed allowing the machine to begin producing ice again.

Bin Control Adjustment

All Models (except those without curtains): Check the bin switch for proper adjustment by swinging the bottom of the curtain away from the evaporator. Slowly bring the curtain towards the evaporator. The switch should close when the bottom edge of the curtain is even with the outer edge of the water trough. Adjust the switch by loosening the screws the hold the switch in place. Move the switch to the proper position and retighten the screws. Recheck the adjustment. **Adjustments are not** n**covered under warranty.**
Undercounter Models or Those Without Curtains
There are no adjustments needed for the bin (magnetic reed) switch**.**

Spare parts list

ITEM NO	CODE	ENGLISH DESCRIPTION
2	1864800100	Ice scoop
3	1860010800	Top panel
7	1861530802	Drain nut
9	1880013104	Condenser
10	1854703700	Hot gas valve body (EVU3)
11	1854702700	Hot gas valve coil（042N4212）
16	1858420900	Compressor
17	1858441300	Compressor starting device component
18	1864802003	Water trough

22	1880001701	Floater valve
23	1864529100	water inlet pipe screw
24	1854700800	Drain valve
25	1864512101	Water out tube of pump
26	1858904400	Water pump
27	1864526600	Water inlet
28	1851700700	Condenser sensor
29	1851701002	Evaporator sensor
31	1864550603	Water sprinkler
32	1880024701	Evaporator (Ice Mold)
33	1861701802	Ice slideway
35	1853703602	Wiring harness
36	1854005700	Magnetism switch
38	1853110500	Power plug
41	1858200601	EBM motor 5W
42	1860700100	Fan blade (ϕ 200X28°)
43	1858201300	EBM motor 10W
49	1854000500	Power switch
50	1854000700	Clean switch
51	1860210400	Under louver
52	186480690L	Door
54	1803200100	Locked screw(Block screw)
55	1880014901	Foot
57	1880008300	Drier
60	1854800300	15A fuse of controller
61	1854202400	Control box